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Project Committee Report

This is an interesting article that describes the non-beneficial effects of beach dredging, which comes with a long list of environmental side-effects. Among these is destruction of sea turtles, fish, and other benthic life.

It reveals that offshore dredging for beach sand is like open-pit strip mining and may cause local rates of erosion to increase many times the preexisting rate of erosion.

Further discussion reveals that Army Corps of Engineers may be the biggest enemy as it proceeds with the destruction of natural beach protection systems causing higher rates of coastal erosion and general environmental degradation.

It may be time for coastal geologists to become more vocal and involved when a Corp proposal for dredging is announced in the future.

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WHAT'S WRONG WITH BEACH DREDGING

The dredge industry refers to beach dredging as nourishment or renourishment, which implies that offshore sand mining and conveyance to beaches offers natural, unalloyed benefits to the coastal system. Aside from being expensive and short-lived, however, beach dredging comes with a long list of environmental side-effects. Professor Wanless (Rosenthiel School of Ocean and Atmospheric Science) notes that as soon as a dredge touches a coastline, everything changes. Beneficial sand formations are lost. Turbidity suppressors (which keep water clear, enabling transmission of sunlight through water) are destroyed. Sensitive coral reefs become blanketed with mucks and fines which are frequent byproducts of dredge projects. Reefs are sometimes accidentally raked with industrial cable during dredge operations.

Dredging destroys sea turtles in a number of ways. Cutter-head dredges grind up the animals as they sweep through sediment where turtles have embedded themselves. When turtles seek a beach to lay eggs, they are drawn to wide, freshly dredged beaches. Unfortunately, dredged beaches are very unstable. They frequently lose considerable width in response to a single storm. Many nests are consequently washed to sea. Dredged beaches also have profile anomalies that can cause ponding in response to summer storms. Ponding water on beaches destroys turtle nests buried below.

Other animals are impacted by beach dredging as well. The mucks and fines released as a dredging byproduct can clog fish gills (gill kill). The large offshore borrow pits associated with beach dredging kill acres of benthic life in both the borrow and placement areas. Dredge operations are also infamous for uncovering and resuspending toxins, reintroducing them to the food web.

Offshore dredging for beach sand is literally submerged, open-pit strip mining. Massive voids are left behind. Nature seeks to fill these voids by impounding the landward migration of cross-shelf drift, sand that would otherwise travel to nearshore areas. Sediment on the dredged beach itself may be drawn (back) to the new offshore voids (borrow pits). Offshore deepening created by the borrow pits allows bigger waves closer to shore (Tanner and others). Studies (Duke-Donner) show that for these and other reasons, beach dredging creates conditions which cause local rates of erosion to increase from two to twelve times the preexisting rate of erosion.

These kinds of self-defeating remedies are not unknown to the Army Corps. In Florida, the corps straightened the meandering Kissimmee River to improve flood control. The project was counter productive because it destroyed the river basin's ability to absorb and slowly release flood waters. The project also destroyed thousands of acres of productive wetlands.

It now seems to be generally understood, after costly lessons with engineered rivers, that increasing flow rates by decreasing resistance to flow has been the wrong approach to riverine flooding. It has become accepted that progressive resistance along a river bed, as provided by natural meander within an absorbent flood plain, is an important factor in controlling floods.

Unfortunately, engineering principles similar to the Corps' old river control policies are still alive and well on the coastline. Coastal engineers (and regulators) consequently strive to increase rates of longshore flow along the coast (since longshore flow is the only source of sand for other beaches, according to engineering theory, it presumably follows that maintaining high rates of longshore flow is beneficial). This policy, however, causes nearshore energy to increase, which translates into higher rates of coastal erosion and general environmental degradation.

Warren Brooks, the journalist who broke the acid rain story, writes that "one of the anomalies of the environmental age is that the Corps of Engineers has become the alleged protector of wetlands when it has traditionally been one of their biggest enemies, especially tidal wetlands threatened by beach erosion...the main reason we are losing beach shoreline at such an alarming rate is not sea level rise, but the destruction of natural beach protection systems by the Corps and its multi-billion-dollar dredge lobby."

Stuart Udall, former Secretary of the Interior, writes that the Army Corps "resembles a brachiosuarus, a giant water-loving dinosaur with less brains per pound of flesh than any other vertebrate. The Corps has survived form the Jurassic Age of Engineering when dams and dredged-out channels were deemed man's greatest gifts to nature."

Of course, it is Congress that has instructed the Corps to do projects when the consequences of such projects have not been fully understood. Unfortunately, now that many of the consequences of dredging are comprehended, the industrial complex that has built up around the Corps, to which the Corps has become significantly compliant, resists basic science and alternative, environmentally sound beach restoration methods based on the findings of coastal geologists.

A recent technical report by the Corps (CERC-89-11) states "Sediment transport by water is a complex phenomenon that is little understood despite more than 200 years of intense study by engineers..." This, however, is not the message the Corps delivers to Congress or the public when it extols the benefits of renourishment. This is also not the message coastal geologist receive when they criticize the Army Corps' unrealistic modeling theories of sediment transport.

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